ICI Magazine

FEBRUARY 1960

The *I.C.I. Magazine*, price twopence, is published for the interest of all who work in I.C.I., and its contents are contributed largely by people in I.C.I. Edited by Sir Richard Keane, Bt., and printed at The Kynoch Press, Birmingham, it is published every month by Imperial Chemical Industries Limited, Imperial Chemical House, Millbank, London, S.W.1 (Phone: VICtoria 4444). The editor is glad to consider articles and photographs for publication, and payment will be made for those accepted.

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The I.C.I. Magazine

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Contributors

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David Lessels *works with the Technical Service Staff of Paints Division. He joined Paints Division after spending his first five years after demobilisation wandering across Africa with a rucksack, going from Cairo to Capetown, back to Nairobi, then across the Congo to Nigeria, through the Sahara to Tunisia, and finally home across Europe from Italy. "I earned my living in many ways," he says, "from shooting crocodiles to carrying stores with an Arab gang."*

James Thurlby, *assistant I.C.I. Press Officer, has been with I.C.I. for five years. Before joining the Company he was in journalism with Yorkshire Newspapers and for six years with the "Irish Times" in Dublin, where he also studied philosophy at Trinity College.*

Contents

FRONT COVER: *Mediterranean Fisherman, by L. J. Bal (I.C.I. Holland)*

EDUCATION AFTER 15—
DIFFERENT ATTITUDES OF
MIDDLE AND WORKING CLASSES—
THE IMPORTANCE OF HUMAN CAPITAL

POINT of VIEW

PROFIT AND LOSS ON EDUCATION

by Mark Abrams

In recent years there has been much talk about the social classes in Great Britain and their differences in outlook and in standards of living. The discussion has sometimes been obscured and confused by vague definitions and by insufficient facts. But most people are agreed that they can recognise at least two substantial groups (or classes) in this country—the approximately 10 million working class families where the breadwinner is a manual worker with a weekly wage, and the 2 million households where the head of the family is a white-collar worker engaged either in the professions or in the high ranks of business and industrial management.

Between these two groups there still exists one very important difference—their attitude towards higher education for their children. This came out very clearly in a recent survey when a sample of parents were asked: "Would you like your son to continue his education after the age of 15?" Most, but not all, working-class parents said that this was up to the boy—if he had brains and if he wanted to, he could carry on. Nearly all the middle-class parents made no allowance for the boy's mental ability or his wishes and simply said flatly that their boy would "of course" continue his education beyond the minimum legal leaving age.

There are various reasons for this middle-class attitude towards education, but whatever they are, the attitude is certainly sensible from the limited viewpoint of the individuals' economic interests. Higher education is a good private investment. Just consider these figures: there are roughly 1½ million adults in this country who received full-time education at least to the age of 19: they account for only 4% of all adults, but between them they dominate practically all the most highly paid occupations in the economy—doctors, senior civil servants, solicitors, university teachers, qualified chemists, engineers and scientists, architects, and directors of large firms.

Middle-class parents appreciate this relationship between higher education and a more prosperous life and direct their children accordingly. Why do working-class parents behave differently? Sometimes, of course, the talent just isn't there and no amount of forcing will do any good. But this isn't always the case. The recently published report of the Central Advisory Council for Education (the Crowther Report) gave some interesting figures about National Service recruits who were the sons of manual workers. Most of them (four out of every five) had left school at 15, but about one-quarter of them, when given various ability tests, were bright enough to be graded in the two highest ability groups. In other words, given the economic opportunity and parental encouragement, these young men, if they had continued their education, would very probably have finished up in well-paid, secure and responsible jobs in industry, science and the professions, which would have been a very good thing simply from the viewpoint of their own self-interest.

But would the country, as a whole, have benefited from this? There can be no doubt about the answer to this. In the past British economic prosperity has depended largely on the cheap availability of abundant coal, the natural good fortune of well-situated ports, the suitability of Lancashire's damp climate for cotton spinning, and so on. But the relative contribution of these natural assets has dwindled steadily, and today, to a much greater extent than ever before, any increase in our economic well-being depends on how quickly our schools and colleges can produce more scientists, more technologists, and trained managers and administrators. The prosperity of the country as a whole now depends, above everything else, on this sort of capital—"human capital." In simple economic terms public interest coincides here with private interest: both are served by the fullest development of our stock of potential ability. And there are abundant facts to suggest that we are still a long way short of that goal.

The opinions expressed in this article are not necessarily those of the Company

PLANNING THE DULUX *RETAIL CAMPAIGN*

By a Special Correspondent

'Dulux' and 'Du-lite' are an I.C.I. success story with a difference, in that they constitute a major break-through into the retail paint market. Here is the background to the sales campaign.

SEVEN years ago I.C.I. Paints Division had no retail selling organisation. Today it is the biggest of Britain's manufacturers of retail paints, and 'Dulux' and 'Du-lite' sold over the counter account for a substantial share of the Division's turnover. How has this remarkable success been achieved?

Largely by ignoring Ralph Waldo Emerson's famous axiom: "If a man write a better book, preach a better sermon, or make a better mousetrap than his neighbour, though he build his house in the woods, the world will make a beaten path to his door." Armed with a better mousetrap, in the shape of an alkyd paint that had been tried and tested in the professional field for years before competitive alkyds even reached the market, the Division decided not to wait for the householders of Britain to beat a path to its door, but to go out and sell.

To see this marketing operation in its proper perspective one must go back to 1952. By that time I.C.I. had built up a network of merchants supplying 'Dulux' to professional decorators and had amassed a considerable reputation in the process. But in each successive post-war year it became plainer that a rich new market was ripening and was to be had for the picking by any paint manufacturer with sufficient resources, initiative and aggressiveness.

More and more people were painting their own houses, inside and out; some, it was said, because they could not afford a professional painting job, others because a higher standard of living enabled them to buy paint they had never bought before, others because they were influenced by the fashion for colourful interiors. And to satisfy this market there were few paint manufacturers of large size selling their products through retailers.

This was the situation that faced the members of Paints Division Board in the autumn of 1952 when, with the marketing plan before them, a decision had to be taken on the question: Shall we go into the retail market, and if so, when? To sell retail would be a complete break not only with Paints Division, but with I.C.I., tradition. To enter the market insufficiently prepared might result in a fiasco that would mean loss of face as well as loss of money. But to delay too long might be equally disastrous, for the competition would by then be well established. The unenviable lot of making the final decision fell to Mr. L. H. Williams, then Paints Division Chairman and now a Director of I.C.I. He decided—and it was a decision that called for a good deal of commercial courage—to enter the retail market at the beginning of the following year, 1953.

A factor that had to be considered most carefully was whether retail sales, by antagonising professional decorators, would jeopardise I.C.I.'s considerable trade sales. Another problem was the size of the retail market: was it really going to be as big as the prophets said? The paint industry was only just emerging from a period of chronic raw material shortages which had pegged down production; no one could say for certain how the market would behave when given free play. The prophets could be wrong, though it seemed they were likely to be right.

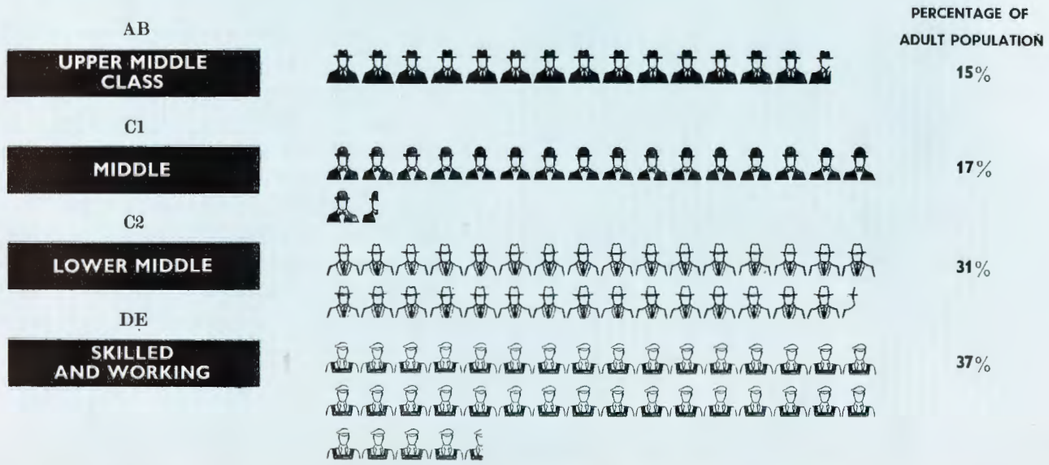
Despite these reservations, from the outset the Division held three good cards: the excellent reputation of 'Dulux' paint ('Du-lite' emulsion paint was not added to the retail range until later); a chain of wholesale merchants already selling I.C.I. paints to professional decorators; and the I.C.I. roundel, which carries a considerable cachet. But those in the Division who were going to have to play these cards—the Decorative Paints Sales Control Manager, aided by his colleagues in Publicity and Distribution Departments—were new boys at the retail marketing game.

They had a matter of months in which to set the stage for the day when 'Dulux' would take its bow before the public. The plan was to sell to retailers through the existing chain of wholesale merchants, and first each of these had to be given details of the campaign and asked if he would co-operate. Almost to a man, they agreed.

The next step was to interest the retailers themselves. An entirely new category of representative—the retail paint sales representative—was recruited, and toured the country interviewing the proprietors of designated paint and wallpaper shops and ironmongery and hardware stores, convincing them that I.C.I. paints were going to be a good line to stock and making arrangements for them to receive supplies from their nearest wholesale merchant. It was an enormous job (just how enormous can be gauged from the fact that today, with the Division's retail business well established, several times the number of representatives is employed), and there wasn't much time. But by the early spring of 1953 these hot-gospellers had signed up several hundred retailers.

Meanwhile, behind the scenes, the physical problems of filling and distributing tens of thousands of small cans of paint every month had to be tackled. A new can-filling shop, capable of filling half a million cans a week, was designed and built at Slough. The distribution depots already used for the Division's trade sales had to be enlarged and improved and new ones established, and a fleet of lorries had to be made ready to keep the depots supplied. Prosaic as it may sound, the distribution organisation was (and is) extremely important: nothing kills public goodwill

Breakdown by classes of the adult consumer market in Britain, totalling 16 million people



RETAILERS

Colour cards and give-away literature are essential selling tools. With shop displays, they are seen by everybody. 100%

PRESS

Press advertising reaches 95% of adult population. This is the maximum practical coverage. 95%

OUTDOOR

Poster and bus side advertising is beamed at towns of over 25,000. Reaches 65% of adult population. 65%

TELEVISION

Effectiveness of TV advertising is limited by the number of people owning sets. Reckoned to reach 53% of adult population. 53%

quite so quickly as exhortations to buy goods that cannot be found in the shops.

When it came to advertising, there was no guiding precept ready for use. There was said to be a vast number of potential buyers, but exactly who they were, or how to come to grips with them, we didn't know. For the first eighteen months we could do little more than follow, in our press advertising, posters and shop displays, a theme that became known in the Division as "visual violence without vulgarity." The overall plan was to put over the names of 'Dulux' and I.C.I. to the public as forcefully as possible.

At that time I.C.I. paints were not only top quality but top price (other brands have since caught up in price), and it was natural to assume that advertising should be addressed to the middle- and upper-income groups. Just how wrong this assumption was only emerged later, when the fledgling retail marketing organisation at Slough really spread its wings.

The way in which the national advertising developed was not such as to cause anyone at Slough to slap his desk and say "We're on the wrong tack!" In fact there was little reason for misgivings, as the eminently satisfactory sales of the first year doubled and redoubled themselves. But one of the first jobs of the recently formed Commercial Research Department was to assess the overall market potential, and their findings made it plain that the richest seams of this retail market were still unexploited. Just where each lay, and how important it was, could not be revealed until enough spare-time interviewers had been recruited to undertake consumer research. This was done in 1954, and more than a hundred interviewers were sent out to question householders according to a scientifically devised plan. The range of questions was designed to show how much people knew about the various brands of paint, which brand they preferred, what their painting habits were, what their buying habits were.

The results of the survey answered some of the questions that the marketing team at Slough had been asking themselves for so long: Who buys paint? Where do they buy it? How do they use it? How do they choose colours? And so on. It was clear that it was not so much the people at the top of the social and economic scale who were in the market for the top-quality paint I.C.I. was selling, but groups much further down the scale, accounting for two-thirds of the whole population. Since their own labour was free, they would be all the more ready to buy top-quality paint that would give the best return for their spare-time work.

Paints Division Marketing Group in session: Mr. S. Coppins (Publicity Manager), Mr. A. H. Deadman (Commercial Research Manager), Mr. W. P. G. Wilson (Decorative Paint Sales Manager—Group Chairman), Dr. W. A. Westgate (Commercial Research Dept.—Group Secretary), Mr. R. G. Stockman (Distribution Dept.).

This discovery had a direct, if not immediate, effect on the Division's advertising. Press advertisements began to appear in the mass circulation newspapers; TV commercials were screened at peak viewing times. Posters, point-of-sale displays and colour guides were other elements in a campaign that was stepped up year by year and that now accounts for by far the greater proportion of the Division's publicity budget.

At the beginning of 1958 a marketing group was set up at Slough, consisting of the Decorative Paint Sales Control Manager, the Publicity Manager, the Commercial Research Manager, and a senior member of the Distribution Department. Informal liaison between the Sales Control and service departments had served well enough until then, but the mounting intensity of the retail marketing operation called for something better.

The group now meets formally once a month to discuss lines of study and lines of action and to pool ideas. Members of the group also meet informally much more frequently. Probably no single factor has contributed more to the success of the Division's over-the-counter sales than the growing acceptance, by everyone from the Division Chairman downwards, that baseless hunches and personal prejudices—no matter who voices them—are no substitute for reasoned interpretation of market research. The Marketing Group enjoys considerable autonomy in its method of operation, without top-level directives, and justifies its existence by results.

But the people concerned—which means everyone in the Division—are by no means complacent about present sales. They are prepared to make a bigger effort to capture a bigger share of a market that is always expanding, and know that even to maintain their present share they must be alert, adaptable, and mercurial in their response to new competitive threats. That is why the Division's market research organisation is always active: testing the response to advertising, keeping a close watch on colour trends and painting habits, checking on brand preferences. Any technical innovations or advertising campaigns launched by the Division in the future will have been justified in advance by this research and not infrequently stimulated by the interchange of experience with I.C.I.'s paint manufacturing associates abroad, particularly in Canada and Australia.

There is a happy footnote to this Paints Division success story: the decision to enter the retail market did not work to the detriment of the professional decorator market already enjoyed by I.C.I. On the contrary, trade sales have increased step by step with retail sales, and many decorators have profited from the retail boom by setting up their own counters for I.C.I. paints.

A sample of I.C.I. Paints literature. "Colourful Homes" sells for 3s.

People and events . . .

Progress on the 'Propathene' Plant

ONE of the results of the magnificent summer we had last year is that progress on the erection of I.C.I.'s polypropylene plant at Wilton has been swifter than anticipated. Reports from the chemical engineers engaged on the job indicate that this 10,000 ton capacity plant will be on stream towards the end of the year. Earlier it was estimated that the plant could not be ready before 1961. The site is now fully developed, roads have been made, and buildings completed ready for the processing equipment to be installed.

Plastics Division has been selling 'Propathene'—I.C.I.'s brand of polypropylene—in pilot plant quantities since May last year. It is now available in the form of coloured compounds as well as natural polymer.

The new 'Propathene' plant is likely to be the first commercial-scale polypropylene plant to come into operation in this country.

(*More about polypropylene on page 58.*)

Extensions at Runcorn

GENERAL Chemicals Division recently announced a £1 million plan to extend by 25% the capacity of the trichloroethylene and perchloroethylene plants at Castner-Kellner Works, Runcorn.

This is a bold step, for already production of these two solvents amounts to many thousand tons a year. But it is justified, the Division feels, on two scores. Demand for these products is steadily rising, and there will be price cuts made possible by the special modified process to be used on the new plant.

Trichloroethylene—the more important of the two solvents—has a number of uses, but the major outlet is for metal degreasing. Since 1927 I.C.I. has made more than 20,000 trichloroethylene degreasing plants. This process, which the Company pioneered and largely developed, is now used by the engineering industry throughout the world. Goods treated range from tintacks and sewing needles to major components for nuclear installations and aircraft.

Perchloroethylene—sold by I.C.I. under the trade name 'Perklone'—now takes first place among the dry-cleaning chemicals used in Great Britain.

Other uses for these solvents include the extraction of fish, meat and vegetable oils, veterinary medicine and the cleaning of guided missile fuel systems.

* * *

"Bomb" Appeal

A CHEQUE for £2276, the contribution of Billingham employees to the Mayor of Middlesbrough's Fund to provide Tees-side with a cobalt "bomb" unit for the treatment of certain types of cancer, was recently handed over to the Mayor, Alderman S. G. Bennett, at a special ceremony held in the main works canteen at Billingham. The presentation was attended by the Mayors of Thornaby and Stockton and representatives of every works and department on the Billingham site.

The appeal fund was launched by Alderman Bennett last May. The Billingham contribution was made up of £1835 13s. 7d. in individual contributions by employees and about £440 in donations from the funds of social sections in the factory and from money which various works sections had won in accident prevention competitions. As we go to press we learn that the target for the appeal of £25,000 has just been passed.

Seventy Years

CHRISTMAS Day was doubly a red-letter day this year for Metals Division pensioner Mr. Frederick Elsden. He and his wife, both a hale and hearty ninety-one, were also celebrating their *seventieth* wedding anniversary—surely a record in I.C.I.

Mr. Elsden is a former employee of Bisley Works at Kemsworth. He started at the factory in 1889, and his final job before he retired in 1930 was as storeman. In the thirty years since he retired he has never once failed to attend the annual pensioners' dinner at the factory.

(*Photo:* Evening News)
Mr. and Mrs. Elsden

Mr. and Mrs. Elsden have lived at nearby Waltham Abbey for over fifty years, and they take an active interest in local affairs. Incidentally, they were the oldest married couple to go to the polls during the recent election. Mr. and Mrs. Elsden have three daughters and a son, five grandchildren and three great-grandchildren.

New Garden Product

AMATEUR gardeners from the really expert down to the merest beginner will alike welcome the news that Plant Protection is adding a new all-purpose fertilizer to the I.C.I. garden products range. Faced with the plethora of fertilizers now on sale in garden shops, each one differing slightly from the next and each intended for a specific crop, it is not surprising if the ordinary gardener gets a bit confused. 'Plus', the new fertilizer, is Plant Protection's answer to this problem. It is organic-based and suitable for anything you care to try and grow in the garden. It is primarily intended as a base dressing to be dug in at the time of the spring digging, but it can also be used to good effect as a top dressing.

A big publicity campaign for 'Plus' is being launched next month, but supplies should already be in most garden shops by the time the *Magazine* is published. 'Plus' is being marketed in 3s. 6d. cartons and in 7 lb., 14 lb. and 28 lb. bags.

New Headquarters

A SPECIAL feature of Alkali Division's new headquarters, officially opened by **Sir Alexander Fleck** on 15th January, is a closed-circuit television link between the accountancy department in the new building and a small cash office at Winnington works, about a quarter of a mile away. By this means anyone who wishes to see his wages record card, which is kept in the accountancy department, can have the card televised on to a receiving screen in the cash office.

Other features of the new building, which has been designed to house more than 700 staff, include special acoustic treatment in all rooms containing office machinery to cut down noise and disturbance to neighbouring offices, electrical services running in specially designed underfloor ducts to provide telephones, call bells and power plugs at any point in the building, and a ventilation system which changes the air three times every hour.

Even the pensioners have not been forgotten. Before the site was cleared for building, a bench at the corner of Moss Road and Winnington Lane was a popular rendezvous for retired employees of the Division. Now a pensioners' seat has been incorporated

in the design of the boundary wall at the corner where they will still be able to sit and enjoy the sunshine.

The new building has been named Brunner House, after Sir John Brunner, one of the founders of Brunner Mond & Co., and the old headquarters building, which now contains the engineering and technical departments and Construction Works, has been named Mond House, after the other founder, Dr. Ludwig Mond.

Duluxe Tours

DETAILS of an ambitious holiday programme taking in the Olympic Games in Rome this summer arrived recently on the Editor's desk. It is being organised by the Paints Division Recreation Club, and members and their friends are being offered the choice of a 10-day stay-put holiday for 49½ guineas, or a longer tour with six nights in Rome and taking in Naples, Florence, Venice and Pisa which costs 69½ guineas. Travel in both cases is by air from London to Pisa. The club secretary reports that bookings are going well.

Slough Recreation Club are by now something of experts at the travel game. Their first venture was back in 1958 at the time of the Brussels Exhibition, when 130 employees and their families and friends flew over to

Belgium for the week-end. Last year a four-day trip to Paris was organised over the Easter holiday.

Record Year

SALES of Plastics Division's products reached a record high level during 1959. At home, sales increased by 15%, and an even more spectacular advance was achieved in the export market, where sales were over 30% up on the 1958 figures.

'*Alkathene*,' I.C.I.'s brand of polythene, contributed substantially to this very satisfactory state of affairs. I.C.I.'s export sales of this material rose by nearly 50%. The outstanding achievement of the year was the successful conclusion of arrangements for I.C.I. and C-I-L to supply the polythene for the third transatlantic cable.

The relaxing of hire purchase restrictions helped to boost the sale of plastics used in cars, TV sets and household equipment, and p.v.c. goods based on '*Corvic*' and '*Welvic*,' such as sandals and beach shoes, leathercloth and long-playing records, made excellent progress. On the debit side there was a drop in the sale of p.v.c. for plastic mackintoshes, which can be blamed directly on the weather.

* * *

The '*Perspex*' factories at Billingham, Wilton and Darwen were hard pressed to meet the demand for sheet. Sales reached a record figure. TV surrounds and implosion guards, which guard against the danger of flying

IN BRIEF

Cheaper 'Alkathene.' The prices of 'Alkathene' (I.C.I.'s brand of polythene) and its compounds have been reduced by 3d. a lb. for the United Kingdom market. The new standard price is 2s. 3½d. This compares with 4s. 3d. in 1951.

Company Law Committee. Mr. E. A. Bingen, a deputy chairman of I.C.I., is a member of the Jenkins Committee set up by the President of the Board of Trade to enquire into Company Law.

Billingham Division's athletics section will achieve a long-held ambition this summer when they play host in July for an athletics international between England and Belgium. The decision that the match should be held at the Synthonia sports stadium was made by the European Committee of the International Athletics Federation.

Petrochemical project. An agreement between I.C.I.A.N.Z. and Shell Chemicals (Australia) for the construction of new petrochemical plants in New South Wales has been reached. Shell are to erect an ethylene manufacturing and purification plant. The ethylene will be used by I.C.I.A.N.Z. in the manufacture of polythene at Botany. This plant, already extended several times, is being further increased, and the total investment by both companies will be over £A10 million.

On stream. Large-scale production of acrylonitrile by General Chemicals Division began recently. The new plant is at Cassel Works, Billingham. The major outlet will be for acrylic fibres.

glass due to a burst tube, were important end products here. New developments for 'Diakon'—the powder form of 'Perspex'—include the G.P.O. coloured telephone.

Coppers Galore

A HUNDREDWEIGHT of copper coins balanced on a pint glass sounds a tall story, but our picture proves it can be done. The object of the exercise was to collect money for a local children's home, and the man behind the scheme was **Mr. William Shanks,** club steward at Dyestuffs Division's Grangemouth Recreation Club.

First, a pint glass tumbler was tried out for strength. A tray was placed on the tumbler and the 12 stone steward stepped gingerly on. It stood the strain. The tumbler with an appropriate notice was then placed on the

Mr. Shanks and his pyramid of coppers

bar counter in the club. Gradually helped by the adhesive properties of beer, the pile of coppers grew.

For those who like figures, on reckoning-up day there were close on 5000 pennies, weighing just under a hundredweight, and the pile was nearly two feet high.

Tea with Roosevelt

BILLINGHAM Division's **Mr. Jack Clark,** who was 62 last month, can look back over a career which started with shovelling gravel on the Billingham site and took him in time to the United States and to tea with the American President.

He helped form the first branch of any trade union at Billingham—the old Winding and General Engineers Society—for the locomen and general workers back in 1920. It was his subsequent union activities which eventually led to the highlight of his career in 1943. He was selected with three other union representatives, including Mr. Jack Jones, the present M.P. for Rotherham, to spend three months in the U.S.A. on a workers' exchange scheme. The four men travelled to factories all over the country and gave lectures on the wartime achievements of British industry.

During their tour they were invited to the White House and entertained at tea by the President and Mrs. Roosevelt, and Jack Clark still has in his possession autographs signed on the back of a photograph of his daughters.

Mr. Clark

Although he reached retiring age last month, Mr. Clark is being retained by the Company on the payroll and hopes in June to complete 40 years' service—all of it on the Billingham site.

Russian Exhibition

PLASTICS Division are planning an exhibition to be held in Moscow and Leningrad during June and July. Two members of the Division, **Mr. Colin McMillan** of Export Department and **Miss Margaret Farrell** of Publicity Department, recently spent five days in the Soviet Union discussing final arrangements for the show.

The exhibition will have a technical theme and will be visited by technical experts from all over Russia. The All Union Chamber of Trade in Moscow has already asked for 10,000 invitations, which they will distribute to high-ranking technicians.

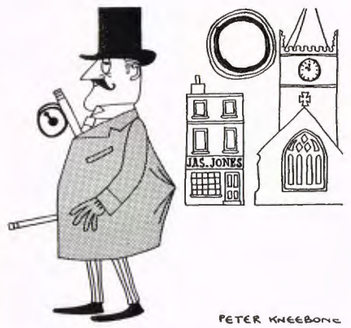
In addition to the static exhibition, in which a large number of the Division's products will be shown, demonstrations of the extrusion of p.v.c. piping and the injection moulding of 'Alkathene'—probably a washing-up bowl—will be given daily.

A series of lectures and film shows will be held in a cinema above the exhibition hall during the run of the exhibition.

Victorian Enterprise

MRS. JENNETT BRATT, at 83 the oldest surviving member of the Oakes family whose story is featured on page 48, had this delightful story to tell our reporter of her father Walter Oakes, one of the first foremen to be employed by Brunner-Mond.

Outside work, she recalls, Walter's great passion was for fishing. But fishing on Sundays was frowned upon in those Victorian days. Walter had his own solution to that problem. Any fine Sunday morning he could be seen setting off for a stroll, the immaculate personification of God-fearing respectability. Only the family knew that



concealed in a special pocket let into the lining of his Sunday jacket were the short sections of a fishing rod of his own design and manufacture.

Y.I.M.

IT is nearly two years since the formation of Yorkshire Imperial Metals, the offspring of our own Metals Division and the Yorkshire Copper Works, and the accounts of the first full financial year have just been published. **Dr. James Taylor,** I.C.I. Main Board Director and chairman of Y.I.M., has this to say about the new company's progress:

He points out that first of all there was severe competition, followed by a trade recession. Nevertheless, because of the strength and savings due to the amalgamation, the new company held its own. In the last half-year there has been a great upsurge in demand for copper tubes and fittings, and the Company has become really busy to such a tune that the ex-I.C.I. factories at Kirkby and Dundee are turning out more than they have ever done before.

The demand for alloy tubes has been very limited, but even so Allen Everitts are fairly fully occupied. The plate works at Landore, however, have been

Traces of past civilisation on Malden Island. (See "Forgotten Industry")

badly hit by the changeover from steam locomotives to diesel and electric.

"Altogether," says Dr. Taylor, "I can report that we are really beginning to see the advantages brought about by the amalgamation, and our conviction back in 1957 that we were doing the right thing for all our people is being fully justified."

Forgotten Industry

OUR back cover picture by **Mr. Philip Coldwell** (Fibres Division) was taken when he was serving as a cameraman with the Royal Navy on Christmas Island in the Central Pacific for the 1957 series of nuclear weapon trials.

Christmas Island is the largest of a group of atolls, and in this region the only one inhabited, but on Malden Island (300 miles south), which Mr. Coldwell visited as one of a special film unit, they found the sad traces of a once flourishing little colony.

The colony was apparently established in the 1860s to exploit the island's rich guano deposits—highly prized as fertilizer. It consisted of eight Europeans and about fifty natives. For thirty years the colonists flourished in spite of the fact that almost all supplies had to be shipped from New Zealand and that water was so scarce that they had to distil sea water. Then came stiff competition from other sources. The colony struggled on but was finally abandoned in 1927.

Today all that remains to tell the tale is the graveyard in the south-west corner of the island, the railway track on which some of the wagons are still in running order (see above), and the ruined buildings. It was in one of these derelict huts that an earlier naval survey party unearthed some of the original documents of the company, and in another found spare parts for one of the earliest models of motor car.

50 YEARS' SERVICE

The following employees have completed 50 years with the Company: **Alkali Division:** Mr. M. Hamlett, Lostock Works, 14th January. **General Chemicals Division:** Mr. J. W. Robinson, Castner-Kellner, 1st January; Mr. W. A. Bradbury, Castner-Kellner, 4th January. **Metals Division:** Mr. T. Andrews, Elliott Works, 5th January.

APPOINTMENTS

Some recent appointments in I.C.I. are: **Billingham Division:** Mr. A. W. Holmes, Prudhoe Works Manager; Mr. J. Rigg, Heysham Works Manager and General Manager of Trimpell Ltd.; Mr. E. Beesley, Manager of Division Process Investigations Department. **Heavy Organic Chemicals Division:** Mr. M. A. E. Hodgson, Development Director. **Metals Division:** Mr. G. A. D. Smith, a Division Managing Director (jointly with Mr. St. J. de H. Elstub). **Nobel Division:** Mr. R. Haslam, Personnel Director; Mr. G. M. Perry, Distribution Manager. **Pharmaceuticals Division:** Mr. W. Birchall, Distribution Manager.

RETIREMENTS

Some recent announcements of senior staff retirements: **I.C.I. (New Zealand):** Mr. D. G. Robie, Director (30th November 1959). **Paints Division:** Mr. J. D. Barr, Joint Managing Director (31st January). **Nobel Division:** Dr. A. C. Richardson, Personnel Director (31st January).

FAMILY PORTRAITS

1—The Oakes of Alkali Division

THERE was an air of uneasy expectancy among the 40-odd men working in the Joiners' Shop. Through the windows they could see approaching the hefty figure of Walter Oakes. As he came nearer, uneasiness deepened. The bowler hat—symbol of foreman status in those days—was tilted at an angle on the back of Walter's head. To those men in the Joiners' Shop of Brunner-Mond at Winnington that meant only one thing: somebody was "for it."

The name Oakes has meant something at Winnington from the erecting of the first Brunner-Mond plant there in 1873 right down to the present day.

For today, no less than seven men called Oakes, each with more than 25 years' service in Alkali Division's mid-Cheshire Works, can truthfully say: "My father and his father before him worked here for around half a century."

Foreman Walter Oakes was one of the first workmen to be engaged by the partners John Brunner and Ludwig Mond. He had served his apprenticeship as a wheelwright, being bound among other things to keep his master's secrets and serve his lawful commands gladly, not to contract matrimony, nor play at card or dice tables, nor haunt taverns or playhouses during the four-year term of his apprenticeship.

Walter died early in 1927, but the Oakes family tradition of service with the Company—now I.C.I.—was by then well established.

Of his five sons and three daughters then living, four sons were or had been employed by the firm. Frank was a blacksmith, Edward was a patternmaker, Ernest a joiner like his father, and Alfred had worked as a cooper at Winnington. Walter's eldest daughter Alice was a cook at Winnington Hall and the two other daughters, Jennett and Margaret, were both married to employees of the firm.

Walter's eldest son, the late Mr. Frank Oakes, started with Brunner-Mond as a boy of 12, and subsequently became a blacksmith, serving for 47 years.

Of his sons, John is on the clerical staff of the Division's Distribution Department engaged on shipping caustic. He has 44 years' service to his credit. Walter, a rigger at Winnington, has 30 years' service, and Cecil is now employed with Construction Works at Lostock and has completed 20 years' service. Two others, George and Reginald, each had short periods of service with the firm.

Walter's second son, the late Mr. Edward Oakes, had a son Leslie who started work with Brunner-Mond as a boy of 14. Leslie is now Engineer (Factories Act) on the Wilton polythene plant. Last year he was in India helping to start up the polythene plant at Rishra.

Walter's fourth son, the late Mr. Ernest Oakes, who died last year, was apprenticed joiner under his father and had completed more than 52 years' service when he retired. Among the jobs he had during that time he could recall making special equipment from sketches given to him by Dr. Mond for experiments in his private laboratory at Winnington. One of his sons, Eric, now a Work Study officer at Wallerscote, also served his apprenticeship as a joiner under his grandfather.

Eric, with over 40 years' service with the firm, has three brothers, all Alkali Division employees. Sydney, a fitter at Winnington Works, has completed 40 years' service. Ernest, foreman with Construction Works at Lostock, has completed 32 years' service, and Harry, process foreman at Winnington, has completed 28 years' service.

From this branch of the family tree stems the youngest Oakes at present employed by the Division. He is Brian, the son of Walter junior. Brian has completed 16 years' service and is at present working as a truck driver in the Bag Warehouse at Wallerscote.

Winnington
Northwich
June 13th 1923

Dear Walter

On the occasion of the celebration of our Company's Jubilee we, the sons of its founders wish to place on record our warm appreciation of and gratitude for your services which for 50 years have been so loyally given, first to our father and since that death, to their successors. We recognize that the personal loyalty and whole-hearted devotion to duty displayed by you and others particularly during the early days of the firm, have contributed in no small degree to its present prosperity.

It is a great pleasure to us to feel that one who shared in the early struggles, is still an active employee and able to participate in the present Celebration.

With every good wish,

Sincerely yours,

John Brunner

Mr. Walter Oakes
Winnington.

A letter signed by the four sons of the founders of Brunner Mond & Co. which accompanied the presentation of a gold clock to mark Walter's 50 years' service with the firm.

Mrs. Jennett Bratt, at 83 the only surviving member of Walter's immediate family, and her nephew Walter Oakes.

At the 75th anniversary of Winnington Works in 1948, 5-year-old Pauline Oakes great granddaughter of Walter Oakes, presents a bouquet to Mrs. W. Lutyens.

The fourth generation—Brian Oakes at work as a truck driver in the Wallerscote Warehouse.

On the cricket field outside the Winnington Recreation Club. L to r. Eric, Ernest, Harry, Sydney, Cecil, John and Brian Oakes.

THE KLISCHOGRAPH

By C. Redman

Electronics have now invaded the field of blockmaking, in other words the making of the plates from which pictures are printed. In one operation the klischograph (as an electronic blockmaking machine is called) does work that used to need three separate stages, all of them demanding great skill—and it does it both better and a great deal faster.

BEFORE describing the function that electronics now fulfil in the production of the printed picture it is necessary to review the conventional photo-engraving technique. As the name implies, photography is the basis of this process.

In letterpress printing, the printing surface of each letter is raised above the non-printing area, thereby enabling the ink image to be transferred to the printed paper. As the pictures have to be printed along with the type to produce the completed page as we see it, it is equally necessary for the pictures to be represented by raised printing surfaces. These raised surfaces are called blocks.

Briefly, the method of making a block by photo-engraving is this. The drawing or photograph is placed in a very large camera and rephotographed; the negative which is produced is then placed in contact with a piece of thin metal, either zinc or copper, which has been coated with a special solution which is sensitive to light—an approach similar to the printing of an ordinary snapshot. The light-sensitive layer is affected by light which passes through the negative, and on development we have a picture on the piece of metal. By special treatment this picture is made to resist the action of acid, which will attack and dissolve the areas of metal not protected by the picture. By careful application of this acid these areas will gradually be recessed into the metal and so leave the picture areas in relief. These raised areas will eventually take the ink in a similar manner to the type and transfer the picture to the paper.

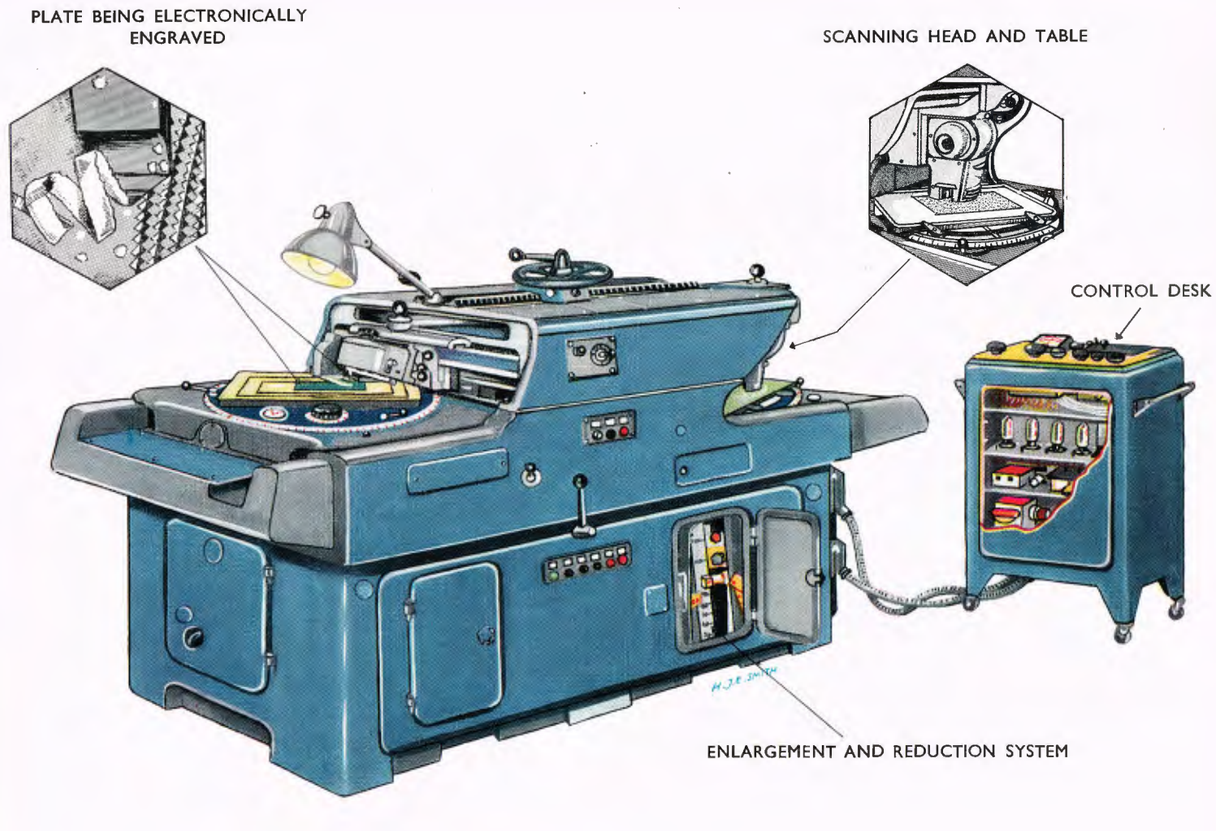
Now, this is all right for illustrations where only lines have to be reproduced, like the lines in a drawing. But where gradations of tone have to be expressed, as in a photograph, a more subtle approach needs to be adopted. This approach is to reproduce the original in the form of dots too small to be distinguished by the naked eye. Now, the larger the dots, the more ink they will carry. Thus, in varying the size of the dots in relation to one another, the printer has at his disposal a means of reproducing the varying tones of a photograph.

If you examine with a magnifying glass any illustration in this magazine you will see that the dots vary in size: the larger ones, carrying more ink, give the appearance of a darker tone; the smaller ones, surrounded by white paper and carrying less ink, reproduce the light tones.

The translation of the varying shades of tone into varying dot sizes is obtained by means of what is called a half-tone screen. This is a network of fine black lines ruled on glass which is placed in front of the photographic plate during exposure for the negative. The dots produced vary in size according to the light and shade of the picture. There are several types of half-tone screens, some very fine for use when making blocks for high-class magazines where the paper is of a very good quality, and others which are very much coarser for use on the rougher paper used for the daily papers. The quality of paper used for this magazine would require a ruling of 133 dots to the linear inch, whereas the normal daily papers use 65 dots per inch.

So much for the background which has to be understood before one can explain the manner in which electronics have entered this field in the shape of the klischograph engraving machine.

The electronic engraving machine produces a letter-press printing plate direct from an original without the use of any intermediate stages. It does this at a rate of between roughly 1½ and 3 square inches per minute, depending on the screen. In eliminating in one step the



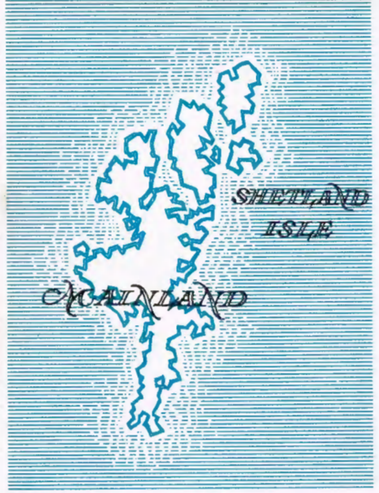
process camera, a ruled glass screen, metal printing and etching, the electronic engraver enables a considerable saving to be achieved in time and space. In addition, the final quality of reproduction is frequently far superior to that obtained by conventional methods.

The basic principles of the klischograph are as follows. The klischograph is an electronically controlled engraving device. The original picture is photo-electrically scanned by a process corresponding to that employed in picture telegraphy. This produces a photo-electric current which is amplified and used for the control of an engraving stylus. In order to produce the screen, a screen frequency is superimposed on the control current, causing the stylus to engrave point by point a half-tone printing plate. The sizes of the dots produced will correspond to the tone values of the corresponding parts of the original picture.

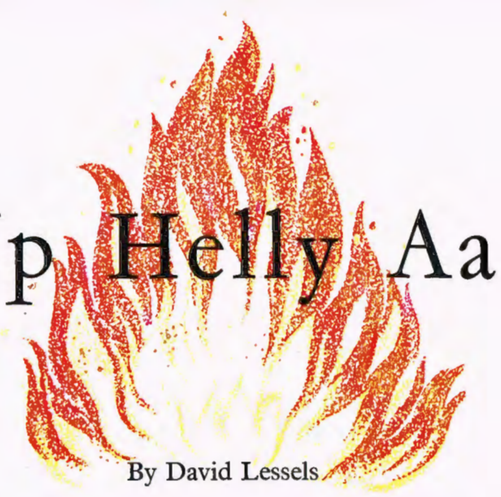
In the Vario-Klischograph illustrated it will be seen that there are two plane tables which move to and fro during the engraving process. On one table is positioned the copy to be reproduced (the scanning table), and on the second the plate to be engraved. This latter may be metal or plastic foil. These tables are hydraulically driven and connected. A continuous range in size from four times enlargement to one-third reduction is possible.

The scanning head is in the form of an electric eye. Four powerful low-voltage lamps combine with an optical scanning system to convey into the control current the signals which represent the varying brightness of the picture. This is fed into a control desk. By the use of various dials, which while looking very formidable are readily understood, the signal can be controlled and the final reproduction produced to individual requirements. There are electronic tone controls which enable poor pictures to be improved. There is also an electronic sharpening device which gives sharp, detailed blocks from fuzzy originals and enables maximum enlargements to be carried out without loss in quality. From the control desk the signal is transmitted to the engraving head.

The Vario-Klischograph is indeed a photo-engraving plant in itself. Electronic engraving methods are unlikely to supersede completely conventional methods, but a considerable amount of normal half-tone reproductions are being produced by this technique, with remarkable improvement in quality and service.



Up Helly Aa



By David Lessels

Each year in the last week of January Shetlanders celebrate the end of winter in a carnival of fire and music that lasts till dawn. This tradition is handed down from a savage Norse ancestry and kept alive by a people with time to be friendly, time to be happy.

A THOUSAND years ago, when Norsemen occupied part of Britain and most of the islands north of it from Norway to Greenland, they welcomed spring with ritual fires and feasting, and drank wine from the skulls of slain enemies. This pagan festivity was known as *Up Helly Aa*, meaning "The End of the Holidays." It celebrated the end of long months of idleness enforced by the winter storms and the almost continuous darkness of northern latitudes. With the coming of spring and longer days the Norse Vikings, or pirates, could put to sea in their longboats to find new lands to conquer or to visit those already colonised.

In the Shetland Isles today, where they are proud of their Viking ancestry, they still celebrate Up Helly Aa. On the last Tuesday of every January the inhabitants of Lerwick don Viking costumes, and for one wild night they relive the pagan revelry of their forebears.

There are still the fires, the feasting and the drinking —from bottles and glasses, not from skulls—but there the resemblance to the old ceremony ends. Today Shetlanders have woven into Up Helly Aa the magic of a Viking funeral and the extravagance of a modern carnival—a blend which produces a scene the like of which is unlikely to be seen outside Hollywood's artificial world.

Up to the end of the last century Up Helly Aa was commemorated in a wild, disorderly manner. Guizers —as the people who dress up are called—rolled burning tar barrels through the streets and into the sea. Sometimes rival factions would meet in the narrow streets, and arguments would arise as to whose barrel would continue on its way.

Then about fifty years ago a group of men formed themselves into the Up Helly Aa Committee. With them was born the modern concept of this ancient ceremony. They formed the guizers into squads which paraded in orderly procession through the streets. Eventually a Jarl—an ancient Norse title—was appointed to lead the procession of Norsemen. The tar barrels were disposed of, and in their place they built a replica of a Viking galley and burned it—an idea culled from an ancient Norse funeral legend.

In Viking days, when a Jarl died they laid him to rest on the deck of his ship together with all his possessions. The ship was set on fire and pushed out to sea on a last voyage to Valhalla—the Hall on the Hill, the Vikings' resting place.

Since the war Up Helly Aa has captured the interest of the world. Newspapers find front page room for photos of wild-looking Vikings and their burning boat. The B.B.C. has televised it, and shots of the procession never fail to appear on film newsreels. With this publicity a growing number of tourists find their way to Lerwick each year to see the spectacle. Even so, the numbers are still comparatively few, because the festival takes place at such a harsh time of year. Last year I was one of those pilgrims who went to celebrate the arrival of the sun.

In planning the journey I wondered just how many more old customs the Shetlanders incorporated in the modern Up Helly Aa. Perhaps, I mused hopefully, the launching ceremony would somehow be worked in. When the Vikings launched their ships they sent them down a slipway across which live maidens were tied as a sacrifice to the Sea God in the hope that he would not capsize the vessel when she struck the water. A difficult thing, this, to emulate these days; the police are so touchy about such matters, even though it be in the best of causes.

Incidentally, this old Viking custom still exists today, though in a modified form. It evolved thus. As the centuries went by, these warriors came to grudge wasting such grand material to pay off the Sea God. So they placed food instead of girls on the slipway and wondered if that would be acceptable. The ships did not sink. The Sea God was not so demanding after all! Came a time when food was scarce, and they poured wine in the path of the boat and anxiously waited. The boat still did not sink. The Sea God was satisfied. Since then nobody has tried to lower the price. So when a ship is launched today a bottle of wine is still sacrificed to the Sea God —a bottle of champagne in lieu of a dozen or so maidens. Truly, the Sea God has humbled his palate!

The voyage from Aberdeen to Lerwick was rough. It usually is at this time of the year. The sea was green and flecked with white, and so was I. Dawn was just stretching itself when the *St. Clair* docked at Lerwick after a seventeen-hour voyage.

Lerwick, the capital, and the only place in the Shetland Isles large enough to claim town status, is a compact, friendly little town. Commercial Street, the main shopping centre, is narrow and paved like an alley from side to side with square flagstones. There are no kerbs. Pedestrians and motor traffic mingle freely. Nobody seems to mind. In this narrow street, which boasts chain stores and at least one self-service shop, tightly packed haphazard houses lean out to meet one another. On the sea front the houses stand gable-on to the weather, some with their foundations actually in the water. Here are smugglers' dens with their lodberries, as the yards between the house and sea are still called.

Lerwick was keyed up, waiting for the ceremony. For weeks now the men had been meeting in each other's houses to design and fashion their fancy costumes. Some had grown beards specially for the occasion. The womenfolk had worked wonders preparing the food given by local merchants. Now all was ready.

At the Market Cross the Guizer Jarl's proclamation was displayed. This giant illuminated address on a board eight feet high by five feet wide depicted a Viking galley with twin rows of oars battling through a tempestuous sea, while the ghost of an old, bearded Norseman stood on the waves and watched over it. The proclamation poked satirical fun at local individuals, particularly those in public offices who had gained fame or notoriety in the past year. Nobody took offence at this. It is deemed an honour to find a place on the Guizer Jarl's proclamation, no matter how derisive the lampooning may be.

By the harbour, under a drizzling, heavy sky that challenged photography, stood the galley—a proud ship, over thirty feet long, with dragon head and curly fish tail and rows of gaily painted shields—such a fine boat with such a short life ahead of it. It seemed a tragedy that it must die that night. Still, no Shetlander I spoke to voiced the least regret or grudged the cost. "We'll build another for next year," they said with enthusiasm.

In the afternoon the Guizer Jarl, bewigged and bearded and resplendent in a magnificent raven-winged headdress, chain mail suit and brown mantle, made a brief appearance beside his ship before going on a tour of the hospitals so that even the sick would not miss the thrill of seeing this year's costumes.

The Guizer Jarl's costume is handed down and used each year. But those of the squads are used once only and replaced by others the following year. This year they were said to be the best of all: red cloaks, white suiting, metal-winged helmets and rawhide shoes complete with crisscross leg thongs, and each man carrying a shield and double-bladed battleaxe —an impressive sight.

The design of the Viking costumes is taken very seriously. Each year the Guizer Jarl's squad represents a real Norse Jarl, and the costumes used are as near as possible to those used at that period. This year they represented Jarl Erik Haakonson, who ruled Norway at the end of the tenth century. His reign is remembered because it was then that North America was discovered by Norsemen from Iceland five hundred years before Columbus sailed west.

The carnival started with a bang. At 7.15 p.m. a lifeboat rocket was fired into the air; it hung over the town like a giant chandelier and for the instant sent a hush through the townsfolk below. Then they burst into life. At once pink and blue flares were exploded in the street and five hundred paraffin-impregnated

torches, each over four feet in length, were ignited—a weird and enchanting light to a fantastic scene.

A pipe band struck up, and from the demoniac flares a thousand lusty voices of the squads and spectators sang the Up Helly Aa song:

> From grand old Viking centuries
> Up Helly has come,
> Then light the torch and form the march
> And sound the rolling drum;
> And wake the mighty memories
> Of heroes that are dumb,
> The waves are rolling on.

Then from out of the pall of smoke emerged twin ranks of torch-bearers and with them the Vikings, their red cloaks vivid, winged helmets and shields gleaming in the torchlight. Between them, pulled by a band of eager boys, was their mighty galley tableau, now a ghost ship sailing through a sea of fire. On the poop, erect and proud, yet perhaps just a little overawed at this pageantry of which he was the leader, stood the Guizer Jarl, his magnificent feathered plume cutting a semi-silhouette against the torchlight —a romantic figurehead.

Behind the Vikings came squad after squad in fancy-dress, some truly wonderful in design and originality. Each group represented something comic or beautiful or impersonated some well-known characters. There were moon-men with two-feet-long necks and wobbling, nodding heads, and men from Mars with high backboards like vultures' wings; long-legged schoolboys in comic rubber faces and houses that moved; great football-headed monsters and gasmeters that lit up; there was a crowd of mandarins in exotic silks and mannequins with comically upholstered busts; Turks in striped nightgowns with great hooked noses and a whole forest of trees with waving branches; clowns with red noses and giant tulips with legs; horses and donkeys and animals ingenious—an incandescent extravaganza of wit and splendour.

Down Town Hall Brae they proceeded, by St. Olaf Street and Union Street and onwards along King Harald Street, singing as they went—their torches a fiery, twisting serpent in the night.

Back they came for the turning movement. The wind tonight will allow it! If the wind is high the turning movement has to be abandoned, the danger of fire from the concentrated forest of torches being too great. At the command of the Guizer Jarl, the galley halts. The procession carries on for a few yards then countermarches for some distance, then countermarches again so that there are six lanes of torches.

. . . From out of the pall of smoke emerged twin ranks of torch-bearers. Between them, pulled by a band of eager boys, was their mighty galley, now a ghost ship sailing through a sea of fire.

The heat, even on this damp January night, is intense; the faces of the moon-men high up among the torches perspire paint and blister.

Onward now to the King George V Playing Field and the highlight of the evening—the burning of the boat. The tableau is placed in position; the guizers gather round it. Silence. Then another rocket swooshes up into the night to signal the start of this part of the proceedings. Round the boat march the Vikings—loud and strident they sing the Galley Song:

> Floats the raven banner o'er us,
> Round our dragon ship we stand,
> Voices joined in gladsome chorus,
> Raised aloft the flaming brand.

The song finished, cheers are shouted. The Guizer Jarl leaps from his boat. A bugle sounds, and five hundred torches arch through the air, like a mighty candelabrum, and thud into the boat's belly. As the flames leap high the squads, subdued now, sing a nostalgic melody of obscure origin. It is called "The Norseman's Home"

A NEW AND PROMISING PLASTIC

By T. Ward (Plastics Division)

Latest arrival in the group of plastics known as polyolefines, of which polythene was the first, is polypropylene—potentially the most important polymer discovered in the last 25 years. The announcement that Plastics Division is to make this new plastic at Wilton prompts the questions: what is polypropylene, who discovered it, what will it do?

POLYPROPYLENE is the lightest of all plastics—about 2% lighter, volume for volume, than the lightest polythene. It does not quite have polythene's flexibility and toughness. But it does have three properties that promise a bright future and a special niche in the plastic world. First, it is rigid like the special high density polythenes, but is easier to process. Secondly, it has a much higher softening point than polythene and so can be sterilised and used at high temperatures without distortion. Thirdly, it stands up to oil, grease and acids exceedingly well and does not have the tendency of the higher density polythenes to stress-cracking in contact with certain chemicals.

These, briefly, are polypropylene's physical properties. But behind this rather prosaic catalogue lies a fascinating story—or rather, a fascinating new chapter in the story that began with I.C.I.'s discovery of polythene some 25 years ago. It involves, among other people, two distinguished academic chemists, one working in Germany, the other in Italy.

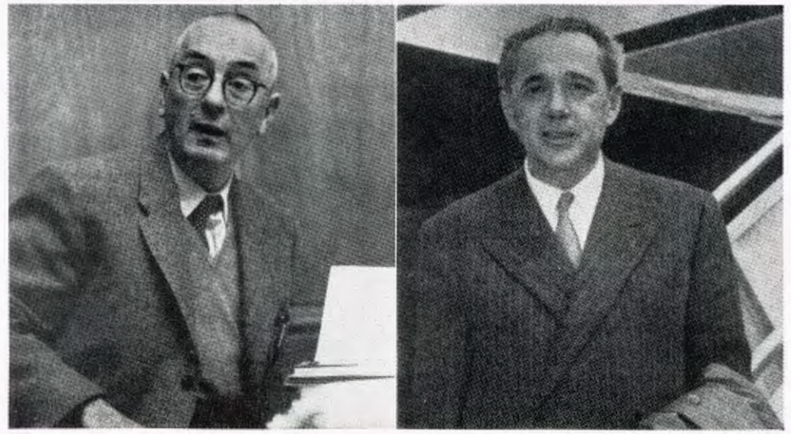
The German chemist Professor Karl Ziegler had held important teaching posts in the Universities of Frankfurt, Heidelberg and Halle before being appointed head of the Max Planck Institute for Coal Research at Mülheim in the Ruhr valley. The activities of this institute are much wider than you might suppose from its title, and in the course of their work Ziegler and his associates made an extremely important discovery.

Investigating the catalytic action of metal compounds on olefines, they discovered by chance that a certain combination of metal compounds dispersed in a hydrocarbon had the effect of polymerising ethylene rapidly. More important, this linking of the ethylene molecules into long chains took place at atmospheric or relatively low pressures (whereas the I.C.I. polythene process required extremely high pressures).

Ziegler's process could be controlled to give a wide range of polymers with varying qualities; and the best of them was a polythene with a higher density, stiffness and softening point than that made by the I.C.I. process. These qualities were due to the fact that in Ziegler's polythene the molecules were arranged with almost perfect precision, while in conventional polythene there were a great many "branches" or side chains of molecules from the main structure. Ziegler discovered his catalyst in 1953, and it was almost immediately put to use in the commercial production of low-pressure polythene—the second (high-pressure polythene being the first) in the group of plastics known as polyolefines.

I.C.I.'s original discovery of polythene had, of course, suggested to many people that other olefines could be made to yield useful plastics by polymerisation. One of the most likely objectives seemed to be the polymerisation of propylene, but repeated attempts to achieve this were disappointing. Neither the I.C.I. high-pressure process nor conventional techniques could be made to yield anything but liquids or waxes of little value. Which takes us to Italy and the next part of the story.

Professor G. Natta was Professor of Industrial Chemistry at the Polytechnic Institute of Milan, and in 1954 in the course of some work with Ziegler-type catalysts he and his associates succeeded where everyone else had failed: they polymerised propylene to solid high polymers. They also discovered that a fraction of this polypropylene had a higher melting point, higher density and lower solubility than the rest, because its molecules were arranged with perfect regularity, all the external carbon atoms being on one side of the polymer chain. More important still, they found that a particular Ziegler-type catalyst gave a high proportion of this type of polypropylene, which Natta termed "isotatic"—a new word, coined from the Greek *isos* (equal) and *tatto* (to set up), to describe polymers with exceptionally regular structure.



Professor Karl Ziegler (left) of Germany and Professor G. Natta of Italy, the two chemists to whom the development of polypropylene is chiefly indebted

Natta was a consultant to the Italian chemical firm of Montecatini, which had been one of the first firms to be licensed by Ziegler to use his catalysts. Shortly after Natta's discovery, an agreement was made between Montecatini and Ziegler which gave Montecatini exclusive rights to polypropylene in Italy and Ziegler similar rights in West Germany. Outside these two countries, Montecatini's and Ziegler's polypropylene rights are licensed by Montecatini, taking Ziegler's wishes into consideration.

It was from Montecatini, therefore, that I.C.I. obtained its licence to manufacture and sell polypropylene in the United Kingdom, and to export to any country except Italy, West Germany and countries where Montecatini may grant manufacturing licences.

The arrival of polypropylene on the scene has been the signal for intense activity in the plastics industry. Another prospective producer in the United Kingdom is Shell Chemicals, who secured rights to the Ziegler catalyst through their purchase of Petrochemicals in 1955 and who recently announced their intention to build a 30,000 tons/year polythene and polypropylene plant at Carrington, Manchester. In Europe, apart from Montecatini themselves, Farbwerke Hoechst in Germany have started production, and Shell in Holland have a pilot plant. In the U.S.A., Hercules Powder Company and Avisun are in production. Other companies in America and Europe have plans to make polypropylene, and future world capacity, as far as one can see at the moment, will be more than 250,000 tons a year, bringing the world capacity for the polyolefines group of plastics (polypropylene and high- and low-pressure polythene) to two million tons a year within the next few years.

I.C.I.'s polypropylene, to be sold under the registered trade mark 'Propathene,' will be made at Wilton in a plant with a capacity of 10,000 tons a year or more, bringing the Company's total capacity for polyolefines to 100,000 tons a year. The process will involve passing propylene (drawn from the Wilton olefines plants) into a suspension of catalyst in a hydrocarbon solvent. The resulting polymer is in the form of fine particles which are separated from the solvent, the latter being re-used in the process. All traces of catalyst are then removed from the polypropylene. which is worked up into suitable granular form.

What will polypropylene be used for? Its properties make it particularly promising for very large mouldings with thin walls, as well as for all kinds of small mouldings. You will probably meet it in the form of moulded domestic ware, refrigerator linings, washing-machine parts, hospital sanitary ware, toilet seats, picnic ware, shoe heels, car and electrical accessories, toys, cutlery handles, bottles and containers. To some extent it will compete with conventional polythene, but it is chiefly expected to make inroads into the market of the higher density polythenes made by low-pressure processes.

Then there are also a number of specialised uses which may be developed. There is, for example, a promising future for polypropylene as a packaging film. It is not only clearer and glossier than polythene film, but can be produced in a stretched form with high clarity, sparkle and crisp handle. Polypropylene also has good electrical properties, and is of considerable interest for wire covering. In the form of extruded pipe and sheet it should find markets in the chemical and other industries for the fabrication of plant. Finally, it has interesting possibilities as a monofilament and fibre, because of its potentially low cost, light weight, high tensile strength and chemical resistance. The main fibre applications suggested at present are ropes, cordage, brushware, filter fabrics, car seat covers and outdoor furniture webbing.

Between them, propylene and the two types of polythene thus have a wide range of uses. But the work of Ziegler and Natta has led to a greater understanding of how to "build" plastics to order, and it is quite possible that new polymers with different sets of properties will in time be added to the polyolefines group.

MODELS PAY OFF

By R. G. Strickland (Billingham Division)

Increasingly, models of complicated plant are proving their worth by quickening the understanding of design projects by all concerned and by showing up mistakes at an early stage. Here a Billingham design engineer writes about the part a £2400 model played in a recently finished extension to a distillation plant.

WHAT purpose do the models serve? Their use means, first and foremost, a considerable saving in time between the stage when a new project is handed out to the engineers by the Research and Development staff and the date building actually begins on the site. Equally important is the point that whereas study of the drawings can occupy a considerable portion of one's available time, a model makes it possible to see at a glance how everything fits in. Technical staff not immediately associated with the design process who have not the time to study a pile of drawings can contribute sound suggestions in a relatively short time when discussing the pros and cons of layout round a model. Such discussions can be most exhilarating, and decision is speedier. Moreover, the job is right before detailed design commences.

As an American engineer once put it: "The squad boss or design leader is usually a very busy guy, harassed, overworked, with falling hair and palpitating ulcers. His principal job is trying to get his subordinates to do what he wants and to explain to his superiors why he has done what he has. Models, he quickly learns, are the answer. Anyone can understand them."

One of the first piping models produced in I.C.I. was for the Refinery Section of the Billingham No. 2 Carbonylation Plant (now part of Heavy Organic Chemicals Division), which started up in February 1957. The carbonylation process has been developed in Britain by I.C.I., and the No. 2 Plant makes butanols—used in the paint industry—from propylene. This plant has proved effectively that while plants built from blueprints run, those built from models run much better. The new Division has since used models for every project unless a special case could be made out against doing so.

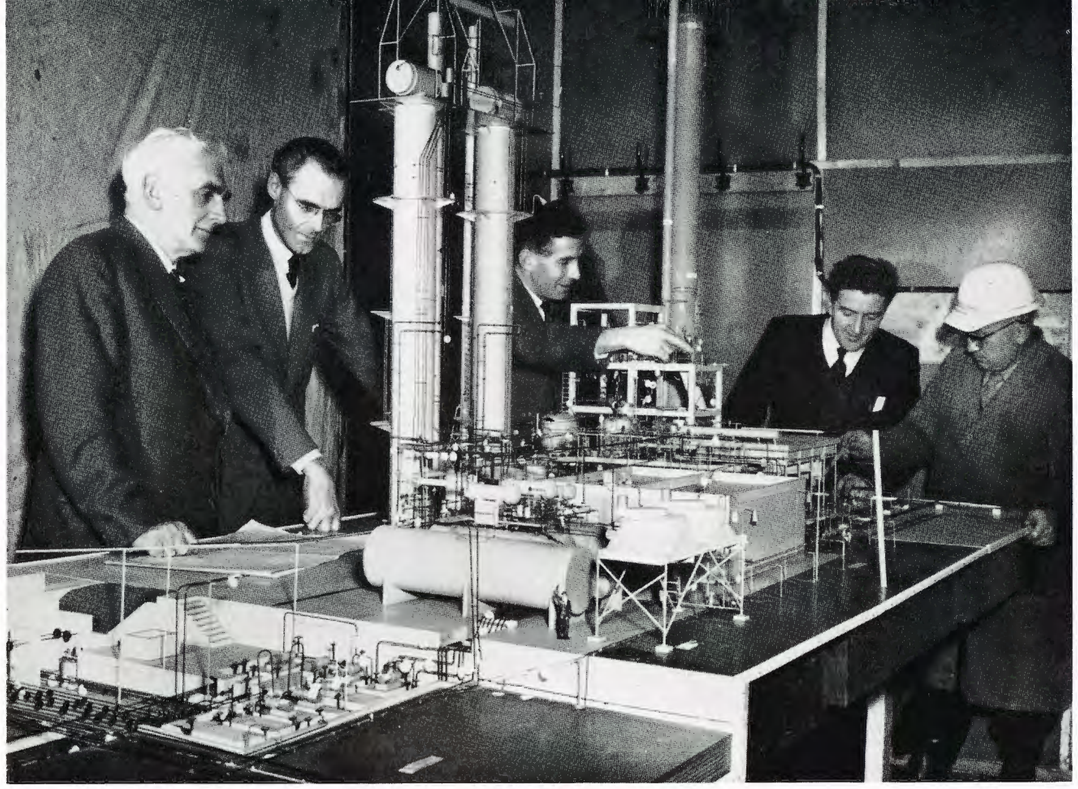
A more recent plant, designed by Billingham Division and just completed, is a distillation plant extension. In this case a complicated layout problem was solved by having equipment such as vessels, heat exchangers and pumps properly scaled at the outset. Their position was largely determined by the piping.

When piping does not significantly influence layout, plant layout models are often very simple. Old matchboxes and tobacco tins are used to represent the main pieces of equipment to be housed in the plant. Making such a model takes only a few hours. Then works representatives, including a work study expert, are called in to approve or modify the layout.

In the case of the distillation plant extension, a good many of the pipes had to be run on the model before the layout could be fixed, and for this reason properly scaled models of the equipment were used. Special thought had to be given to the layout to fit it into the limited space available, and at the same time allow for the erection of the large pieces of equipment such as the distillation column, over 100 ft. high. The answer to this was to raise it to the vertical position on a nearby road and then "walk" it into place.

This particular model also demonstrated the use to which models can be put for determining the design of structural frameworks for supporting equipment. In this case the design of the structure was not completed until many of the principal pipelines had been run on the model. In other words, the structure was designed round the plant.

The model was constructed to a scale of $\frac{1}{2}$ in. to 1 ft., and before the design of the extension could proceed, the existing plant, complete with pipes, also had to be



A typical I.C.I. model being discussed by members of Billingham Division staff. Left to right: H. E. Tanner, Plant Engineer; R. G. Strickland, Design Engineer; T. W. G. Hart, Section Engineer; D. Grey, Designer, and J. Taylor, Construction Supervisor.

modelled. The total cost of the model was about £2400, which gives some idea of the intricate work involved. This, however, is very small compared with the estimated cost of the completed plant.

The most intricate job of the lot is putting in the piping on scale models. This was done on the spot in the Division drawing office by a team of qualified designers. Such a model can be piped up by a model-maker in about ten weeks. When using models, round table conferences can be called as design proceeds so that non-technical as well as technical staff can express opinions and weigh in with their queries and criticisms on design, construction or operation of the plant. On this particular job the need for layout alterations was realised before design had proceeded too far, so that when the time came to issue detailed drawings of the piping, these were approved without difficulty and with only minor alterations.

In the drawing office the designers make detailed drawings for the pipe-maker in the workshops either direct from the model or from sketches used by the model-maker when piping up the model. In this case about 5000 ft. of piping was used.

On completion of the drawings the model was sent to site, and during construction was housed in a small wooden hut in the shadow of the existing plant. The model was there for the construction people to refer to at any time of day—and, make no mistake about it, these men are among the most enthusiastic supporters of plant models. As the supervisor in charge explained, it saved him personally any number of trips back to his office to refer to the blueprints. With a model, too, you get a better overall picture of the job, and this helped him particularly when explaining work schedules in advance.

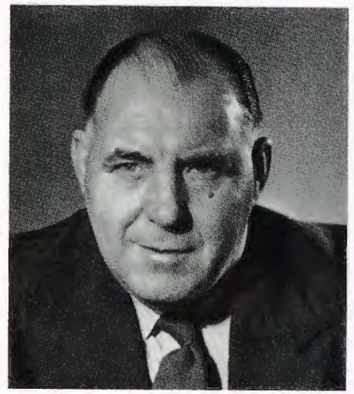
The distillation plant extension went into production at the end of last year, and the start-up went smoothly, as is usually the case when models are used for design and construction.

In 1958 an I.C.I. Model Panel brought out a report on the chemical plant model development so far carried out in I.C.I. The target is to cut down piping design work through the use of these models by as much as 50%. We are not there yet, but the designers feel that the goal is already in sight. There are appreciable savings too in calendar time and in construction effort, and a much better quality of design results from the use of models.

NEWS IN PICTURES

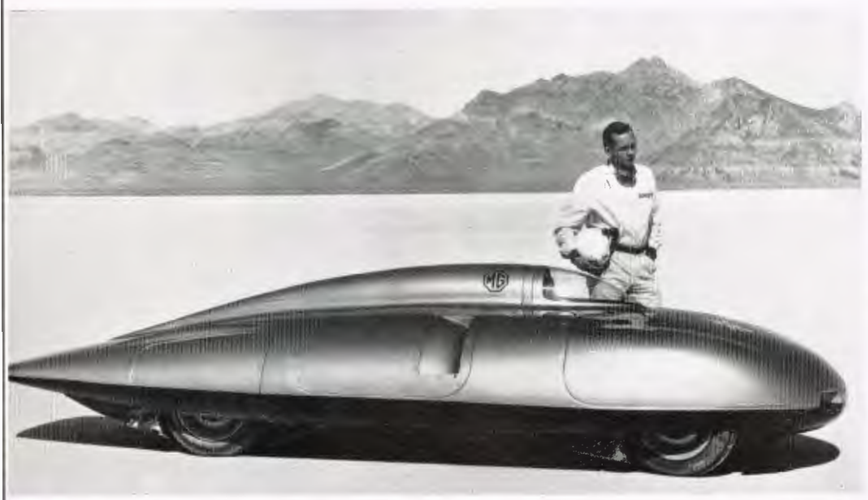
Home and Overseas

Singing star. Dyestuffs Division's choir and orchestra gave a highly successful performance of Handel's *Messiah* at Christmas. One of the choir, Miss Mary Waters (*seated, right*), who works in the Hexagon House Library, took the soprano solo alongside three professional soloists. The conductor was Maurice Handford of the Hallé



New Year Honours. Miss W. M. Springford, principal secretary to Sir Alexander Fleck, I.C.I. Chairman, received the M.B.E. in the New Year's Honours List. She joined Nobel's Explosives Co. in 1918 and last July completed 41 years' service. She was previously secretary to Lord McGowan and to Mr. John Rogers. *Below:* Mr. J. B. Atherton, an electric welder at Billingham Division, received the B.E.M. He is a Works councillor and a shop steward and has been a Billingham employee for nearly 30 years

Union Convenor retires. When Mr. W. J. Carron, President of the Amalgamated Engineering Union (*right*), visited Tees-side recently he presented Mr. C. Hammond (Billingham Division) with gifts on his retirement as shop stewards' convenor. Mr. Hammond, seen here with his wife, has been a member of the union for nearly 40 years

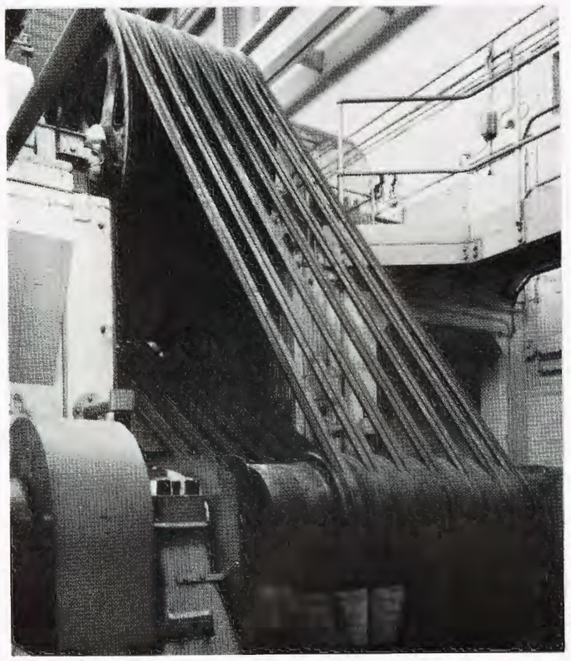


Record smasher. The M.G. Ex 181 in which the American driver Mr. Phil Hill broke six international records in the 1500–2000 c.c. engine class at Bonneville Salt Flats, Utah. The car was specially fitted with a 'Terylene' reinforced pump driving belt

Gardening talks. Percy Thrower, the well-known TV gardening expert, is to give a series of lectures to I.C.I. amateur gardeners by arrangement with Plant Protection Ltd., who market I.C.I.'s garden products. He made his debut last month when he gave a talk to gardening enthusiasts at Fibres Division headquarters

Cargo from Tees-side. Just another vessel leaving the busy Middlesbrough docks? This one has a special story. Against a background of the transporter bridge and the distant Billingham skyline, the Russian ship *Rasliv* sails for home with a large consignment of Plastics Division products

Gomia explosives factory was formally handed over to Indian Explosives Ltd. in December, following a month's trial at full production load, when the designed rate of production was actually exceeded by 8 per cent. Our picture shows four of Nobel Division's starting-up party—Messrs. Boyd, Burns, Gilmour and Stevenston—arriving back in Scotland



Switching to 'Terylene.' A new development for 'Terylene' is in reinforcing V-belts for power transmission, where it results in a life of up to three times that of standard belts. Among the I.C.I. Divisions changing progressively over to 'Terylene' reinforced V-belts are Pharmaceuticals, Nobel, Dyestuffs, Salt, Paints, Metals and Billingham, and Wilton Works

Bomb Fund. A cheque for £2276, the Billingham factories' contribution to the Tees-side Cobalt Bomb Fund, was presented to the Mayor of Middlesbrough (*centre*) recently. Others in the picture are (*l. to r.*) Mr. W. J. V. Ward (Division Chairman), the Mayor of Thornaby, Cllr. L. A. Watson, the Mayor of Stockton, and Messrs. A. R. Allardyce and W. H. Ferguson (both of Billingham). (*See story on page* 44.)

Fifth anniversary. Alkali Division Chargehands' Association celebrated its fifth birthday recently. Guest of honour at the celebrations was Mr. R. A. Banks (*second from left*), I.C.I. Main Board Director. He is seen here talking with Messrs. R. A. Gerrard, J. Stagg, H. Cross and E. Molyneux

Stock Exchange visit. Our pictures show some of the Trustees of the Foremen's and Workers' Pension Funds who visited the Stock Exchange recently. After seeing the film *My Word is my Bond* they watched the operations of the Exchange from the Visitors' Gallery. *Above:* A hostess explains points of procedure. *Left:* Mr. C. M. Wright, Personnel Director, and Mr. G. K. Hampshire, Director in charge of Paints and Plastics Divisions, seated left and right of the hostess, accompanied one party

The jackpot. Five lucky Billingham men who share a £43,845 football pools win are Messrs. M. Spence, C. McDougall, W. Burridge, F. Taylor and C. Harriskritt. All are employed in the Cassel Works laundry. *Left:* Mr. Taylor and his wife went to London to collect the cheque from Harry Secombe

Cockle gathering in Gower and Cheriton Church are just two of the Christmas cards designed by Mr. Edward Martin of Metals Division's Waunarlwydd Works and his wife. They are members of the Gower Society, which exists to protect and preserve that very lovely corner of Wales

Brighter advertising. Our picture shows a bus fitted with one of the new illuminated signs in which I.C.I. 'Perspex' plays a big part. The advertisement is silk-screened on to a large sheet of 'Perspex' which is illuminated from behind by neon tubing using transistor power

Nylon made at Wilton Works has been used to cover the lower half of this silver coffee service. It was designed by Stuart Devlin, an Australian student at the Royal College of Art, and is now part of the permanent collection of the Worshipful Company of Goldsmiths

Top of the bill at Alkali Division's recent Sportsmen's Evening was Yana, the popular radio and TV star. She is seen here with Messrs. Devlin, Norrie and Ward, who queued up for autographs

Darby and Joan party. A party for over 300 old people living in Paddington was held last month. It was paid for by voluntary contributions from Head Office staff. Here Charlie Chaplin (Mr. D. Marsh, Secretary's Dept.) leads the dancing

A lot can be learned about ski-ing without even going out of doors. Pictured here at one of Ardeer Recreation Club's preliminary dry-ski classes are Rosina Miller, Jean Scott, Jean Angus, Norma Hughes and Irene McNeish

Recollections of an English I.D.W.

By James Thurlby

An English "Irishman's Diary" writer! Perhaps it could only happen in Ireland. The author, who spent six years on the journalistic staff of the "Irish Times," believes he holds the unique distinction of being the only Englishman to write the "Irishman's Diary" for that paper.

WHEN I first arrived in the *Irish Times* office in Dublin one of my new colleagues asked: "Do you drink?" I said I was not averse. "Good," he said. "We'll introduce you to the Pearl Bar." So we went out into Westmoreland Street and round the corner into Fleet Street (the name's the same—the thoroughfare is narrower), and I was baptised in what I would have called Guinness but what I was assured was really stout, sometimes also known as porter. Years later in the same hostelry a well-known B.B.C. commentator told me that he had travelled around Ireland on a wave of porter. He looked none the worse for his experience. In fact he was aglow with health and good will. This is not to suggest that the Irish drink too much. But they are a great deal less inhibited about their drinking than we are. For instance, they open their pubs at ten in the morning and don't close them until eleven-thirty at night, except for one "holy" hour between 2 p.m. and 3 p.m. And in the far west, of course—well, time takes on a whole new and more elastic dimension.

But there is one famous Irishman who does not drink—Eamonn de Valera, the great patriot rebel, now President of Eire. In May 1954 I reported Dev's election tour for the *Irish Times*. A colleague was reporting the election speeches of the Opposition leader, Mr. Costello. We had arranged that we should submit to each of the leaders a set of ten thorny questions for answer through the columns of our newspaper.

Mr. de Valera spent some time in County Clare, his own constituency, staying at the Carmody Hotel, an establishment for which he had a quite profound sentimental attachment because it was there that he had stayed for long periods in more hazardous and troubled times. I passed my list of questions to him through his A.D.C., a colonel in the Irish Army, and for some days heard nothing. In fact I began to think we had been a little too ambitious in expecting an outgoing prime minister to answer questions quite as bald as: "If returned to Government, do you propose, in the coming year, to retain taxation as it is at present on beer and spirits, motoring and cigarettes?"

I was wrong. A phone call from the A.D.C. summoned me to see de Valera in the Carmody. Once there I was conducted to his room, a dim, panelled apartment with a huge four-poster bed in a far corner. I found him stern and unsmiling. He wore the black cape which he often favoured. A tall, grave man in black.

He dictated to me his answers to the questions (he said he *would* retain taxation on beer and spirits) and then asked for his replies to be read back to him, corrected small points of emphasis, and finally indicated that the interview was over. I thanked him and prepared to leave, but all at once he seemed to relax and asked me about my work in Ireland, how long I had been there, what I thought of the country.

The conversation flowed. He asked if I would

have a drink. Sobriety is a good election-time quality, and I rarely drank at these times. I asked if I might have an orange juice. This pleased de Valera, and he explained that he did not drink and that he did not think highly of the practice. He asked his A.D.C. to order the drinks—orangeade for him and me, together with whatever the A.D.C. wanted.

This brand of liquid evangelism was evidently too much for the A.D.C., for a few moments later we were treated to the illuminating spectacle of the Colonel returning with a tray bearing *three* glasses of orangeade. We talked on for quite a while, and I drank Mr. de Valera's health and success. Perhaps our tipple wasn't strong enough, for he lost the election. But he had only a year or two in opposition before being returned to power again.

Ireland is a small country with a decreasing population, so that after a while you seem to be meeting everyone for the second or third time. Similarly, Irishmen seem to be ubiquitous. They have colonised most corners of the earth. While in Dublin I spent four pleasant, if overworked, years simultaneously trying to absorb an honours course in philosophy at Trinity College and report the Irish scene for the *Irish Times*. This schizophrenic existence often involved me in the attempt to absorb metaphysical wisdom in the morning and listen with patience to more loquacious but less philosophical public addresses in the evening.

A knowledge of philosophy came in handy when I accompanied R. M. Smyllie, editor of the *Irish Times*, to Kilkenny Grammar School to attend a ceremony in honour of Bishop Berkeley, the great Irish philosopher and divine. R.M., a man of considerable girth and with a prickly walrus moustache, was given to pungent expression of his views. We discussed Berkeley during the car ride from Dublin, and I summarised his philosophy, with unfair brevity, by saying that he believed the external, seen world existed only when apprehended by the minds of men. From this it would seem to follow that if there were no sentient minds about the external world must cease to exist.

I produced a book I was reading which contained the two famous Ronald Knox limericks on this aspect of Berkeley's metaphysics. I showed them to Smyllie. He studied them for a couple of minutes. "I'll quote these," he said, chuckling as he handed the book back.

In his speech to the assembled school he quoted both limericks impeccably. The first was:

There was a young man who said "God
Must think it exceedingly odd
When he finds that this tree
Continues to be
When there's no one about in the quad."

This was greeted enthusiastically by the boys if less warmly by the Berkeleian scholars. R.M. went on with the second limerick, which takes the form of a reply to the first:

"Dear Sir, your astonishment's odd,
I am always about in the quad.
And that's why this tree
Continues to be,
Since observed by Yours faithfully, God."

The audience was delighted, and R.M. went on to make some play on one of Bishop Berkeley's latter-day eighteenth-century pseudo-scientific enthusiasms—his belief in the efficacy of tar water as a panacea for rheumatism and other afflictions.

In a Carlow pub later that day I complimented R.M. on his prodigious memory (for he hadn't read the limericks more than twice). "Thanks for your help," he said. "Have a drink on it." "Thank you, I will," I replied. His eyes sparkled above the vast moustache. "One large Scotch for me and one large tar water for me friend," he boomed at the bartender. Smyllie died a year or so ago. By his death Irish journalism lost one of its most wise, colourful and best-loved characters.

I had many happy moments working for the *Irish Times*. Sooner or later everyone comes to Ireland, so that the bag of visitors is a varied one. I remember Mr. Clement Attlee, then British Premier, escaping me and everybody else to a holiday in the west without saying a word to the Press, even though he posed for a photograph with the President of Ireland!

There were the film stars, too—John Wayne (with a handshake like a steel grab), Bob Hope (he was continually interrupted during his act at the Dublin Theatre Royal by a belligerent Irishman: "Let's you and me finish this act out in the alley," suggested Bob resignedly; a moment later the man was escorted from the theatre), and Frankie Laine ("He doesn't bend the notes at all, he cripples them," a critic wrote; his fans didn't mind).

There were the exhilarating moments such as that when the greater part of the world's stock of O'Malleys descended upon Westport in County Mayo for a clan reunion. They came from places as far apart as Leeds and Chicago to celebrate the 1500th anniversary of the conversion of the clan to the faith by St. Patrick. There were O'Malleys in tweeds and O'Malleys in

. . . We talked on for quite a while and I drank Mr. de Valera's health and success in orangeade

Sunday suits; O'Malleys in caps and O'Malleys in flowered hats; red-haired O'Malleys and white-haired O'Malleys. It was quite a party. The hotel where I stayed locked the doors and let no one in after 8 p.m. It was inhospitable, but it was an act of profound wisdom.

There were the exhilarating interviews, too. The one, for instance, over tea and toast in Stephen's Green Club with that fiery, charming, civilised, white-bearded Irishman, Dr. Thomas Bodkin. He had just told the Irish Premier that the Irish national museum in Kildare Street was like a second-class marine junk dealer's shop. The premier had been shocked. Dr. Bodkin, nibbling toast, talking with delighted animation, went on to tell me what he thought of a new raised, paved construction ornamented with concrete flower bowls in front of Leinster House, the home of the Irish Dail or Parliament. Irish politicians had just secured the removal of the statue of Queen Victoria which had brooded inappropriately for some fifty-odd years over the comings and goings of the country's elected representatives. The new concrete creation had replaced her. "That monstrosity," Dr. Bodkin called it with soft venom, "it's like a floating dock. If you had barges in Kildare Street, now, it would make a fine place to moor them."

There were the noisy evenings, too—fortunately few in number—when the I.R.A. took a hand. "Bomb Thrown at British Embassy in Dublin" reads a front-page headline for 24th January 1951. Happily an obliging character who lived nearby phoned us each time he heard a bang. Happily, too, he wasn't overworked.

But all our days were not so full of sound and fury. There were the quieter, more dignified lectures within the walls of learning. And there is the allegedly true but probably apochryphal story of the quietest lecture of all—that given by a well-known Irish poet, of distinctive appearance and unusual views, on "Modern Irish Poets." Having been introduced by a university professor at some length, he rose and said distinctly, "There are *no* modern Irish poets," and sat down. But I never could find out whether that one was true.

Ireland is a seductive place in which to live. The Irish have a very high regard for time. They don't hurry it and harass it and try to take it by the forelock as we do in this country. They leave it to its own devices a good deal more. That is perhaps why a good many English people who go to Ireland for a year or so find themselves staying for 25. Once having survived an initial period of frustration, in which the subtle flexibilities of Irish appointment-making are revealed to them, they often settle back for life.

Bookshop Rummage

by W. H. Cliffe

WHAT comes into your mind when someone mentions old books? Do you think of a barrow in some dreary side-street, heaped high with discarded productions? Do you hurry by with scarcely a second glance? Or do you take the view that hidden away there may be something rare and valuable?

Most of the books on a barrow are not worth a penny more than the modest price asked. It is safe to say there are no treasures there today. Nevertheless, there are occasions in the dusty, ill-lit bookshop when finds can still be made.

Perish the thought that any true book collector will contemplate selling his treasures. Now and then, however, he might buy something which he wishes to read but not to keep. Once, rummaging through old books, I found a Quaker pamphlet printed about 1660 (I forget the exact date) priced at 1s. 6d. Soon afterwards, in the hands of a famous firm of auctioneers, it changed owners again. It was bought by a well-known dealer for £3 10s. and is hardly likely to have passed from him for less than £5.

Another time I paid 12s. 6d. for something which realised close on £4 in the auction rooms. By what happy chance did I send it to a London auctioneer? Such a question is an irresistible temptation to assume an air of wisdom tempered by modesty as I murmur that it was not a question of chance; I knew a thing or two. Which, for once, was true. Any seventeenth-century pamphlet in reasonably good condition is worth 1s. 6d. of anyone's money, and may be worth £10 of somebody else's. Tracts of this kind streamed from the Royalist and Parliamentary presses during the Civil War, unbound and villainously printed, to be read and thrown away. They are mirrors of history today.

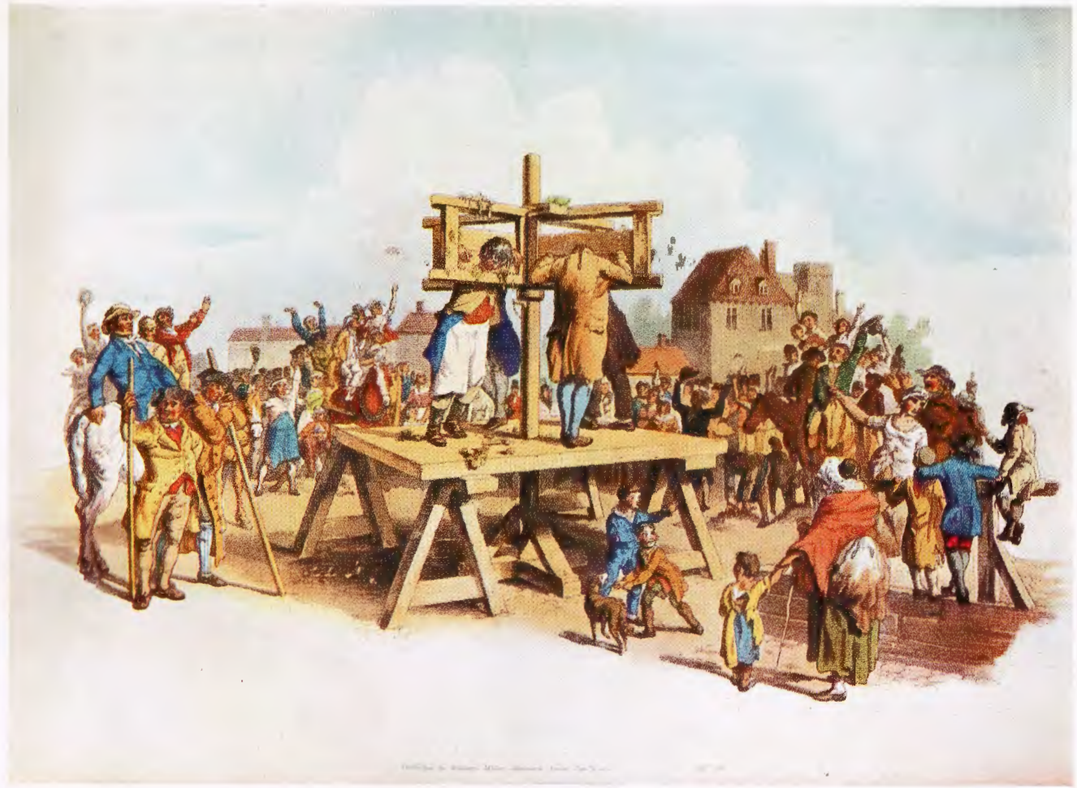
Years ago I once made a bid, by post, for a mid-seventeenth-century work on chemistry. The catalogue said "and seven others," which usually means that the buyer is likely to find himself saddled with seven valueless books. My bid of a few pounds secured the book I wanted, and "the seven others." Imagine my delight when I discovered that one of the seven was a rare alchemical work which I had never seen before and have never seen since. I certainly could not have afforded to buy it through the normal retail channels.

Since those days early science books have greatly increased in value. They are not likely to be found on the book-barrows. Still, it is fun to look—and one never knows.

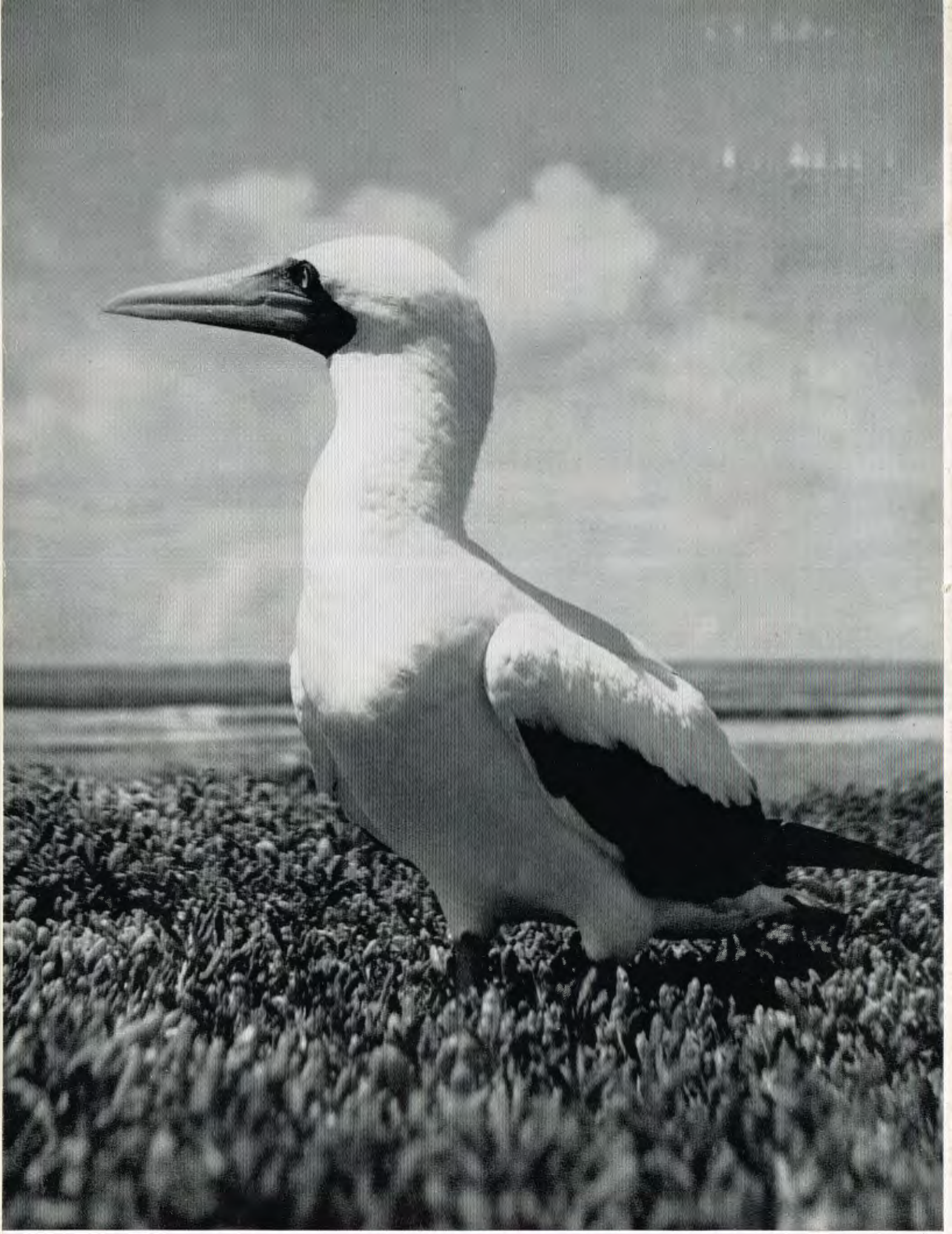
There was a time during the war when the inhabitants of a certain town arranged a special collection of paper for salvage. They turned out in droves and laid on the pavements their bundles of magazines, school books, newspapers, and everything else which could be pulped. But among the dross was a little gold which fell into the hands of a book dealer at, no doubt, a trifling cost. A folio volume dated 1809 in its original condition with 96 magnificent aquatint plates, coloured by skilful hands as was then the practice. The dealer made a handsome profit when he sold it to me, but his delight was nothing to mine, for ten times his price would not have been unreasonable.

In this same town, and not very long afterwards, an antique dealer wrapped up my parcel quite unaware of my sudden feeling of affection for him. He knew Sheraton and Hepplewhite, but he did not know books, and neither did that unknown person who sold him a noble volume which became mine for exactly £1. How could any man bear to part with such a treasure for so miserable a sum? It came from the press in 1489. Its ink was a pure black, and its pages, scarcely touched by time, rustled like banknotes when turned and glowed with colour where the large initials had been filled in by hand. I care little about its money value, but it must be considerable, for no other copy has been recorded during the last sixty years.

The fact is, there will always be hope of a find as long as there remains one single dealer who knows less of his business than he should. Peering through the murky windows of forgotten shops or ransacking the bookstalls will certainly result in a dusty nose or soiled hands. Almost as certainly it will be a waste of time. But somewhere in this country, deep in a heap of Latin primers and dreary sermons, there may be rewards for those with the patience to search. Perhaps a volume proudly bearing a date before 1500, or another with bold woodcuts of the sixteenth century from Germany or the more graceful pictures from Italy. Or an early medical book, or a volume of Restoration plays, or a colour plate book of the early nineteenth century, or a Roger Payne binding. They probably won't turn up, but it's fun to look.



The Pillory. A hand-coloured aquatint from "The Costume of Great Britain" by W. H. Pyne (1818), in the possession of the author.



Pacific Gannet

Photo by P. N. Coldwell (Fibres Division)